

Department of Energy
Carlsbad Field Office
P. O. Box 3090
Carlsbad, New Mexico 88221
APR 28 2004

ENTER



Mr. Steve Zappe, WIPP Project Leader
Hazardous Waste Permits Program
New Mexico Environment Department
2905 E. Rodeo Park Drive, Bldg. 1
Santa Fe, NM 87505

Subject: Transmittal of Approved RFETS WSPF Number RF121.01- TRM Inorganic
Nonmetal Debris

Dear Mr. Zappe:

The Department of Energy, Carlsbad Field Office (CBFO) has approved the Rocky
Flats Environmental Technology Site (RFETS) Waste Stream Profile Form (WSPF)
RF121.01.

Enclosed is a copy of the approved form as required by Section B-4(b)(1) of the WIPP
Hazardous Waste Facility Permit, No. NM4890139088-TSDF.

If you have any questions on this matter, please contact me at (505) 234-7357 or
(505) 706-0066.

Sincerely

Kerry W. Watson
CBFO Assistant Manager
Office of National TRU Program

Enclosure

cc: w/o enclosure
J. Kieling, NMED
C. Walker, TechLaw
M. Strum, WTS *ED
R. Chavez, WRES *ED
L. Greene, WRES
S. Calvert, CTAC *ED
WIPP Operating Record
CBFO M&RC

*ED denotes Electronic Distribution



WASTE STREAM PROFILE FOR

RF121.01, Revision 0

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Waste Stream Profile Number: RF121.01Generator site name: RFETSTechnical contact: Eric D'AmicoGenerator site EPA ID: CO7890010526Phone number: (303) 966-5362Date of audit report approval by NMED: March 9, 2000 as amended February 6, 2001; May 24, 2001; June 5, 2001; April 5, 2002; April 8, 2002; August 20, 2002; August 29, 2002; December 20, 2002; April 8, 2003; September 19, 2003; and December 30, 2003Title, version number, and date of documents used for WAP certification: Rocky Flats Environmental Technology Site TRU Waste Characterization Program Quality Assurance Project Plan, 95-QAPP-0050, Version 9, February 2004.Transuranic (TRU) Waste Management Manual, 1-MAN-008-WM-001, Version 7, February 2004.Contact-Handled Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant, Revision 1, March 2004.Did your facility generate this waste? ☒ Yes ☐ No If no, provide the name and EPA ID of the original generator:Waste Stream Information (1)WIPP ID: RF121.01(2)Summary Category Group: S5000(2)Waste Matrix Code Group: Inorganic Nonmetal Debris(2)Waste Stream Name: TRM Inorganic Nonmetal Debris (D007, D008)(2)Description from the WTWBIR: The waste consists of low-grade oxide derived debris waste assigned EPA Hazardous Waste Numbers D007 and D008. (2)Defense TRU Waste: ☒ Yes ☐ NoCheck one: ☒ CH ☐ RH Number of SWBs N/A Number of Drums 221 Number of Canisters N/ABatch Data Report numbers supporting this waste stream characterization: See Table 7.List applicable EPA Hazardous Waste Codes(3): D007, D008Applicable TRUCON Content Codes: RF 130A, RF 130B, RF 130BA, RF 130D, RF 130DF, RF 130E, RF 130F, RF 130G, RF 130GF, RF 130H, RF 130I, RF 130J, RF 130K, RF 130N, RF 130P, RF 130PA, RF 130PAF, RF 130 PF, RF 130Q, RF 130R, RF 130RF, RF 130S, RF 130SF, RF 130T, RF 130U, RF 130V, RF 130VFAcceptable Knowledge Information (1)Required Program Information

- Map of site: Reference List, No. 3
- Facility mission description: Reference List, No. 3
- Description of operations that generate waste: Reference List, Nos. 1, 2, 3, 6
- Waste identification/categorization schemes: Reference List, Nos. 8,9
- Types and quantities of waste generated: Reference List, Nos. 1, 2, 3, 6
- Correlation of waste streams generated from the same building and process, as appropriate: Reference List, Nos. 1, 2, 6
- Waste certification procedures: Reference List, No. 5

Required Waste Stream Information

- Area(s) and building(s) from which the waste stream was generated: Reference List, Nos. 1, 2, 6
- Waste stream volume and time period of generation: Reference List, Nos. 4, 6
- Waste generating process description for each building: Reference List, Nos. 1, 2, 6
- Process flow diagrams: Reference List, Nos. 1, 2
- Material inputs or other information identifying chemical/radionuclide content and physical waste form: Reference List, Nos. 1, 2, 3, 6
- Which Defense Activity generated the waste: (Check one) Reference List, No. 3
 - ☒ Weapons activities including defense inertial confinement fusion
 - ☐ Naval Reactors development
 - ☐ Verification and control technology
 - ☐ Defense research and development
 - ☐ Defense nuclear waste and material by products management
 - ☐ Defense nuclear materials production
 - ☐ Defense nuclear waste and materials security and safeguards and security investigations

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Supplemental Documentation: See the References section in the Acceptable Knowledge Summary (attached) for additional backup documentation associated with this waste stream.

- Process design documents: Note 4
- Standard operating procedures: Note 4
- Safety Analysis Reports: Note 4
- Waste packaging logs: Note 4
- Test plans/research project reports: Note 4
- Site data bases: Note 4
- Information from site personnel: Note 4
- Standard industry documents: Note 4
- Previous analytical data: Note 4
- Material safety data sheets: Note 4
- Sampling and analysis data from comparable/surrogate Waste: Note 4
- Laboratory notebooks: Note 4

Sampling and Analysis Information⁽¹⁾

[For the following, when applicable, enter procedure title(s), number(s) and date(s)]

- ☒ Radiography: Reference List, Nos. 14, 15
- ☒ Visual Examination: Reference List, Nos. 11, 16, 17
- ☒ Headspace Gas Analysis
 - VOCs: Reference List, No. 7, 12, 13
 - Flammable: Reference List, No. 7, 12, 13
 - Other gases (specify): N/A
- ☒ Homogeneous Solids/Soils/Gravel Sample Analysis (Tables 1, 3, 4, and 5 are not applicable and not included)
 - Total metals: N/A
 - PCBs: N/A
 - VOCs: N/A
 - Nonhalogenated VOCs: N/A
 - Semi-VOCs: N/A
 - Other (specify): N/A

Waste Stream Profile Form certification:

I hereby certify that I have reviewed the information in this Waste Stream Profile Form, and it is complete and accurate to the best of my knowledge. I understand that this information will be made available to regulatory agencies and that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

[Signature]
Signature of Site Project Manager

G. A. O'Leary, Manager TRU Programs
Printed Name and Title

Date 4/28/04

C. L. Ferrera
Signature of Site QA Officer

C. L. Ferrera, TWCP Site QAO
Printed Name and Title

Date 4/28/04

NOTE

- (1) IDC 532C is not included in the WTWBIR.
- (2) The waste stream is derived from waste that is actually identified in the WTWBIR (RF-TR0067) and/or is similar to waste identified in the WTWBIR (RF-TR-0087). The WPPP ID assigned corresponds to the Waste Stream Profile Number. The Summary Category Group, Waste Matrix Code Group, Waste Matrix Code and Waste Stream Description are based on acceptable knowledge (see attached AK Summary). The BIR ID reported in WWIS is assigned using standard BIR conventions for those containers that do not have a valid BIR ID in the WTWBIR.
- (3) EPA Hazardous Waste Codes were determined using acceptable knowledge and confirmed using headspace gas sampling and analyses (see attached Characterization Information Summary documenting this determination).
- (4) See the References section in the Acceptable Knowledge Summary (attached) for additional backup documentation associated with this waste stream.

REFERENCE LIST

1. Backlog Waste Reassessment Baseline Book, Waste Form 29, Oxide, February 2004
2. Waste Stream and Residue Identification and Characterization (WSRIC), Version 7, February 2004, and archived versions.
3. RFETS TRU Waste Acceptable Knowledge Supplemental Information, RF/RMRS-97-018, Version 11, January 2004.
4. Waste and Environmental Management System (WEMS) database.
5. Transuranic (TRU) Waste Certification, PRO-X05-WC-4018, Revision 6, February 2004.
6. Acceptable Knowledge TRU/TRM Waste Stream Summaries, RMRS-WIPP-98-100, Section 7.20, Revision 1, March 2004.
7. GC/MS Determination of Volatile Organics Waste Characterization, L-4111-X, January 2002.
8. Waste Characterization, Generation, and Packaging, 1-PRO-079-WGI-001, Revision 4, May 2002.
9. Waste Characterization Program Manual, 1-MAN-036-EWQA-Section 1.6.1, Revision 3, May 2002.
10. Interoffice Memorandum from Douglas K. Sullivan to Eric L. D'Amico, Headspace Gas Analysis Data Evaluation Report For Waste Stream Profile RF121.01 Lot 1, DKS-004-04, February 2004.
11. Residue Repack, Building 371, PRO-544-SALT REPACK-371, Revision 5, January 2002.
12. Headspace Gas Sampling and Analysis Using An Automated Manifold, L-4231-F, March 2002.
13. Headspace Gas Sampling and Analysis Using An On-Line Integrated System, PRO-1676-HGAS-S&A, Version 2, January 2004.
14. Real-Time Radiography Testing of Transuranic and Low-Level Waste, 4-W30-NDT-00664, Version 8, November 2003.
15. Mobile Real-Time Radiography Testing of Transuranic and Low-Level Waste, PRO-1520-Mobile-RTR, Version 2, November 2003.
16. Glovebox and C-Cell Waste Operations, PRO-1358-440-VERP, Version 5, February 2004.
17. RTR Visual Examination Confirmation, Building 371, PRO-1608-VECRR-371, Revision 0, October 2002.

Form A
Reconciliation with Data Quality Objectives

I certify by signature (below) that sufficient data have been collected to determine the following Program-required waste parameters:

WSPF # RF121.01

Item	Check Box ^a	Reconciliation Parameter
1	✓	Waste Matrix Code as reported in WEMS.
2	✓	Waste Material Parameter Weights for individual containers as reported in WEMS.
3	✓	The waste matrix code identified is consistent with the type of sampling and analysis used to characterize the waste.
4	✓	Container mass and activities of each radionuclide of concern as reported in WEMS.
5	✓	Each waste container of waste contains TRU radioactive waste.
6	✓	Mean concentrations, UCL ₉₀ for the mean concentrations, standard deviations, and the number of samples collected for each VOC in the headspace gas of waste containers in the waste stream/waste stream lot.
7	N/A	Mean concentrations, UCL ₉₀ for the mean concentrations, standard deviations, and number of samples collected for VOCs in the waste stream/waste stream lot. Summary Categories S3000 and S4000.
8	N/A	Mean concentrations, UCL ₉₀ for the mean concentrations, standard deviations, number of samples collected for SVOCs in the waste stream/waste stream lot. Summary Categories S3000 and S4000.
9	N/A	Mean concentrations, UCL ₉₀ for the mean concentrations, standard deviations, and number of samples collected for metals in the waste stream/waste stream lot. Summary Categories S3000 and S4000.
10	N/A	Sufficient number of samples was taken to meet statistical sampling requirements.
11	✓	Only validated data were used in the above calculations, as documented through the site data review and validation forms and process.
12	✓	Waste containers were selected randomly for sampling, as documented in site procedures.
13	✓	The potential flammability of TRU waste headspace gases.
14	✓	Sufficient number of waste containers was visually examined to determine with a reasonable level of certainty that the UCL ₉₀ for the miscertification rate is less than 14 percent.
15	✓	Whether the waste stream exhibits a toxicity characteristic (TC) under 40 CFR Part 261, Subpart C.
16	✓	All TICs were appropriately identified and reported in accordance with the requirements of the WIPP WAP prior to submittal of a waste stream profile form for a waste stream or waste stream lot.
16	✓	The overall completeness, comparability, and representativeness QAOs were met for each of the analytical and testing procedures as specified in the WIPP WAP Sections B3-2 through B3-9 prior to submittal of a waste stream profile form for a waste stream or waste stream lot.
18	✓	The RTLs (i.e., PRQLs) for all analyses were met prior to submittal of a waste stream profile form for a waste stream or waste stream lot.
19	✓	Appropriate packaging configuration and DAC were met and documented in the headspace gas sampling documentation and the drum age was met prior to sampling.
20	✓	Whether the waste stream can be classified as hazardous or non-hazardous at the 90-percent confidence limit.

^a Check (✓) indicates that data or acceptable knowledge are sufficient to determine the waste parameters and that the waste parameters have been reported in the listed document or database. N/A indicates parameter does not apply to waste stream. NO indicates data are insufficient.

Signature of Site Project Manager

G. A. O'Leary
 Printed Name

Date

4/28/04

Data Summary Report—Table 2: Headspace Gas Summary Data

WSPF # RF121.01

Sampling and Analysis Method (check one):

☐ 100% Sampling☒ Reduced Sampling

2A

ANALYTE ^a	# Samples ^b	Transform Applied ^c	Normality Test (Pass/Fail) ^d	Min. Sample Sized	Mean ^d	UCL ₉₅ ^a	Transformed RTLe	Un-Transformed RTLe (ppmV)	EPA Code ^f
1,1-Dichloroethane	0					1.30		10	
1,2-Dichloroethane	0					1.35		10	
1,1-Dichloroethylene	0					1.10		10	
cis-1,2-Dichloroethylene	0					1.35		10	
trans-1,2-Dichloroethylene	0					1.15		10	
1,1,2,2-Tetrachloroethane	0					0.95		10	
1,1,1-Trichloroethane	0					1.40		10	
1,1,2-Trichloro-1,2,2-Trifluoroethane	0					0.95		10	
1,2,4-Trimethylbenzene	0					1.20		NA	
1,3,5-Trimethylbenzene	0					0.95		NA	
Acetone	0					11.50		100	
Benzene	0					1.05		10	
Bromoform	0					1.15		10	
Butanol	0					9.50		100	
Carbon disulfide	0					1.25		10	
Carbon tetrachloride	0					1.45		10	
Chlorobenzene	0					0.65		10	
Chloroform	0					1.15		10	
Cyclohexane	0					1.30		NA	
Ethyl benzene	0					0.95		10	
Ethyl ether	0					1.30		10	
Methanol	1	None	Fail ^p	N/A	10.39	11.598	N/A	100	
Methyl ethyl ketone	0					13.00		100	
Methyl isobutyl ketone	0					9.50		100	
Methylene chloride	0					1.30		10	
o-Xylene	0					1.00		10	
m,p-Xylene	0					1.80		10	
Tetrachloroethylene	0					1.25		10	
Toluene	2	None	Fail ^p	0.00075	2.379	3.186	N/A	72.02 ^h	
Trichloroethylene	0					0.95		10	

NOTES:

^a A total of 14 samples were collected and analyzed. Analysis was performed for all analytes identified. Samples were not composited.

^b Identifies the number of samples in which the associated analyte was detected.

Data Summary Report— Table 2: Headspace Gas Summary Data (continued)

NOTES (continued):

- ^c Identifies the type of data transformation used, if applicable, to achieve (or better achieve) a normal probability distribution of the data.
- ^d Statistics calculated based on using $\frac{1}{2}$ the MDL for less-than-detectable observations with data transformation as identified (Reference 10). When transformation was applied, the Mean and UCL_{90} values presented are the transformed values (Reference 10). With no detectable concentrations, listed mean reflects average of one-half of reported MDL values for analyte and calculation of standard deviation and UCL_{90} values is not meaningful. With fewer than five detectable concentrations, calculated values for UCL_{90} are subject to potentially large relative error.
- ^e RTLs for headspace gas analysis results correspond to the analyte PRQL for analytes that are WIPP WAP target analytes. "NA" means the analyte is not a WIPP WAP target analyte, but instead a flammable VOC that is analyzed for compliance with the TRUPACT-II Authorized Methods for Payload Control (TRAMPAC).
- ^f No entry indicates no associated EPA Code assigned to the waste stream based on headspace analysis.
- ^g Data set (with or without transformation) did not pass the test for normality. The data set that most approximated a normal distribution was used for computation of statistics.
- ^h Limit used for evaluation of EPA Hazardous Waste Code for toluene (Reference No. 3).

Data Summary Report— Table 2: Headspace Gas Summary Data (continued)

WSPF # RF121.01

2B

TENTATIVELY IDENTIFIED COMPOUND (TIC)	Maximum Observed Estimated Concentrations (ppmV)	# Samples Containing TIC
No TICs identified in the headspace gas samples for the waste stream lot.		

Did the data verify the acceptable knowledge? ☒ Yes ☐ No

Data as reported in Data Summary Report – Table 2 confirm acceptable knowledge in that no toxicity characteristic volatile organic or F-listed solvent EPA codes are applicable.

If not, describe the basis for assigning the EPA Hazardous Waste Codes:

**Data Summary Report— Table 6: Exclusion of
Prohibited Items**

WSPF # RF121.01

The absence of prohibited items is documented through acceptable knowledge. Radiography or visual examination is performed on each container in this waste stream to verify the absence of the following prohibited items:

- Liquids
- Non-radionuclide pyrophoric materials
- Waste incompatible with backfill, seal and panel closure materials, container and packaging materials, shipping container materials, or other wastes
- Explosives or compressed gases
- Waste exhibiting the characteristics of ignitability, corrosivity or reactivity
- Non-mixed hazardous waste

Newly generated waste is characterized by visual verification (VV) at the time of waste packaging using the visual examination (VE) technique unless the use of radiography in lieu of, or in combination with, visual verification is justified by any of the following criteria:

- Visual verification was conducted during packaging, but was unacceptable,
- Visual verification requires extensive handling of high gram content waste that results in high radioactive exposure for the VV personnel,
- Situations where waste packaging is conducted at numerous locations generating small quantities of transuranic waste requiring a large number of VV personnel, and/or
- Where waste was originally packaged as low-level waste, but subsequently determined to be transuranic.

Each container of waste is certified and shipped only after radiography and/or VE either:

- Did not identify any prohibited items in the waste container, or
- All prohibited items found in a waste container by radiography or VE are identified and corrected (i.e., eliminated or removed) through the site non-conformance reporting system.

**Data Summary Report— Table 7: Correlation
of Container Identification to Batch Data Reports**

WSPF # RF121.01

Package No.*	Inner Can No.	Radioassay Data Package	Headspace Sample Batch No.	Headspace VOC Data Package	VV Data Package
DA2708	Z27722	371TG5-DP-041403	04W0156	HGAS-DP-00872	SO-DP-088
DA3040	Z27945	371TG3-DP-042303	04W0156	HGAS-DP-00872	SO-DP-094
DA3182	Z27735	371TG5-DP-041503	04W0156	HGAS-DP-00872	SO-DP-088
DA3256	Z27727	371TG3-DP-041403	04W0156	HGAS-DP-00872	SO-DP-089
DB8061	Z27705	371TG5-DP-041403	04W0156	HGAS-DP-00872	SO-DP-089
DB8062	Z27718	371TG3-DP-041403	04W0156	HGAS-DP-00872	SO-DP-089
DB8639	Z27733	CALG-DP-02351	04W0156	HGAS-DP-00872	SO-DP-088
DC0969	Z27739	371TG5-DP-041603	04W0156	HGAS-DP-00872	SO-DP-092
DC0984	Z27950	CALG-DP-02293	04W0156	HGAS-DP-00872	SO-DP-094
DD8176	Z27891	371TG3-DP-041703	04W0156	HGAS-DP-00872	SO-DP-093
DD8178	Z27737	371TG5-DP-041503	04W0156	HGAS-DP-00872	SO-DP-089
DD8378	Z27970	371TG5-DP-042503	04W0156	HGAS-DP-00872	SO-DP-099
DD9413	Z28905	CALG-DP-02370	04W0156	HGAS-DP-00872	SO-DP-133
DD9493	Z28945	CALG-DP-02373	04W0156	HGAS-DP-00872	SO-DP-134

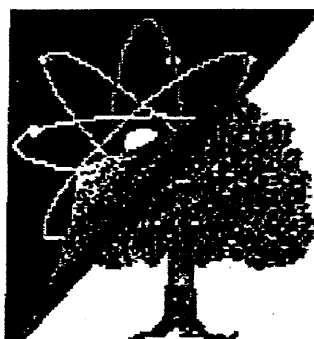
NOTES:

- * Radiography was not performed on any of the containers identified here. Instead, the waste contents for these containers were visually examined prior to or at the time of packaging/repackaging using the VE technique.

Acceptable Knowledge Summary

WSPF # RF121.01

RMRS-WIPP-98-100, Acceptable Knowledge TRU/TRM Waste Stream Summaries, Section 7.20, TRM Inorganic Nonmetal Debris (D007, D008) (attached).



Rocky Flats Environmental Technology Site

ACCEPTABLE KNOWLEDGE INFORMATION

**ACCEPTABLE KNOWLEDGE TRU/TRM
WASTE STREAM SUMMARIES**

RMRS-WIPP-98-100

Section 7.20

TRM Inorganic Nonmetal Debris Waste (D007, D008)

Profile No. RF121.01

Revision 1

Reviewed for Classification/UCNI

By: Unclassified Not UCNI

Reference Exemption Number CEX-032-00

Date: March 18, 2004

Approval signatures in Site Document Control history file

7.20 TRM Inorganic Nonmetal Debris (D007, D008)

Profile No. RF121.01

Acceptable Knowledge Waste Stream Summary

Waste Stream Name: TRM Inorganic Nonmetal Debris (D007, D008)

Generation Buildings: Buildings 371 ^(4,5,6)

Waste Stream Volume (Newly Generated): 221 55-gallon drums ^(5,9)

Generation Dates (Newly Generated): March 2002-August 2003 ^(5,9)

Waste Stream Volume (Projected): None ^(9,13)

Generation Dates (Projected): N/A ^(9,13)

TRUCON Content Code⁽¹⁾: RF 130A, RF 130B, RF 130BA, RF 130D, RF 130DF, RF 130E,
RF 130F, RF 130G, RF 130GF, RF 130H, RF 130I, RF 130J, RF 130K, RF 130N, RF 130P,
RF 130PA, RF 130PAF, RF 130 PF, RF 130Q, RF 130R, RF 130RF, RF 130S, RF 130SF,
RF 130T, RF 130U, RF 130V, RF 130VF

Process Knowledge Demonstrates Flammable VOCs in Headspace < 500 ppm: Yes (see Section 7.20.6)

7.20.1 Transuranic Waste Baseline Inventory Report Information ⁽²⁾

WIPP Identification Number(s): RF121.01

Summary Category Group: S5000 Waste Matrix Code Group: Inorganic Nonmetal Debris

Waste Matrix Code: S5129

Waste Stream Name: TRM Inorganic Nonmetal Debris (D007, D008)

Description from the TWBIR: Low-grade oxide derived debris waste assigned EPA Hazardous
Waste Numbers D007 and D008.

NOTE: IDC 532C is a newly created IDC for repack operations and thus is not identified in the TWBIR. However, this waste is derived from waste that is actually identified in the TWBIR (RF-TR0067) and/or is similar to other waste that is identified in the TWBIR (RF-TR-0087). The WIPP ID assigned corresponds to the Waste Stream Profile Number. The Summary Category Group, Waste Matrix Code Group, Waste Matrix Code and Waste Stream Description are based on acceptable knowledge as provided in Section 7.20.2.

7.20.2 Waste Stream Description

This waste is generated by similar activities, and is similar in material, physical form, and hazardous constituents, and therefore is considered a single waste stream. TRM Inorganic Nonmetal Debris is assigned EPA Hazardous Waste Numbers D007 and D008. Table 7.20-1 presents the waste matrix codes and waste material parameters for this waste stream.⁽³⁾

Table 7.20-1, TRM Inorganic Nonmetal Debris (D007 and D008)

IDC	IDC Description	Waste Matrix Code	Waste Material Parameters	Weight % (Average)
532C	Downblended Oxides <10%, Downblended Misc. Oxides	S5129, Unknown/Other Inorganic Nonmetal Debris	See Note 1	

Note 1: Waste material parameters and weights will be determined during visual verification at the time of packaging or by RTR for retrievably stored waste, as appropriate.

IDC 532C, Downblended Oxides <10%, Downblended Misc. Oxides: This IDC includes debris derived from repackaging Nondestructive Assay (NDA) standards (IDC 060SW) and segregated gross impurities (e.g., glass, graphite mold pieces) separated from the different foundry and scrape out oxide streams (IDC 159W). The "W" appended to the oxide IDCs is to designate which containers of oxides are waste.^(4,5)

7.20.3 Areas of Operation

TRM inorganic nonmetal debris assigned EPA Hazardous Waste Numbers D007 and D008 was generated by the following defense operations and repackaged in Building 371:^(3,4,5,6)

- Plutonium Recovery
- Waste and Residue Repackaging

7.20.4 Generation Processes

Oxides were feed to, or intermediate materials from, historical recovery and purification operations generated by many production, recovery, and research and development (R&D) activities on site. Residual plutonium in the form of casting skulls, plutonium metal, metal turnings, floor sweepings, fines, and other miscellaneous materials containing plutonium were oxidized at the point of generation (e.g., Buildings 371, 559, 707, 776/777, and 779). Following oxidation, the plutonium oxides were fed to recovery operations. The recovery operations included a variety of pyrochemical and aqueous operations. Historically, the site segregated these oxide materials by IDC based on process origin and/or to designate the subsequent steps for plutonium recovery operations. Only the operations for those IDCs that resulted in repackaged debris waste are described below.⁽⁴⁾

IDC 060S consists of manufactured NDA standards prepared by the Chemical Standards Laboratory in Building 371. The oxide standards were prepared by mixing diatomaceous earth with plutonium oxide (IDC 060) generated primarily in Building 707 furnaces at or above 450°C. These standards are manufactured objects used to calibrate drum counters, can scanners, calorimeters, and other instrumentation used for analysis or detection.⁽⁴⁾

IDC 159 consists of miscellaneous material screened from the oxide (IDC 060) generated in the Building 707 foundry operations and material screened from the scrape out oxide (IDC 067) generated in Buildings 371 and 776 electrorefining operations (i.e. material periodically scraped out of tilt-pour furnaces). Prior to screening, the oxides (IDC 060 and 067) were calcined a minimum of 1 hour at 450°C. The oxides were passed through a 40- mesh sieve to separate gross impurities from the oxides. For oxide being shipped off-site, the sieving operation occurred after successful completion of the loss-on-ignition test (greater than 0.5-wt. % loss when heated to 1000°C). The screenings consist primarily of glass, graphite mold pieces, screws, nuts, and bolts.⁽⁴⁾

Prior to repackaging in Building 371, a "W" was appended to the feed oxide IDCs to designate which containers were waste in accordance with the requirements of DOE direction concerning the disposition of low-grade oxides to WIPP rather than to the Savannah River Site. This direction is based on the Amendment to the Record of Decision on Waste Isolation Pilot Plant Disposal Phase Supplemental Environmental Impact Statement and the Supplement Analysis for the Disposal of Certain Rocky Flats Plutonium-Bearing Materials at the Waste Isolation Pilot Plant. The oxide derived debris waste materials were repackaged to meet requirements for interim safe storage criteria (ISSC), as well as the WIPP WAC and WAP requirements. The cans were opened inside the glovebox, and the material was inspected to verify that it is consistent with the assigned IDC. High and low plutonium concentration materials of the same IDC could be combined to ensure that safeguard termination limits were not exceeded. If sufficient amounts of low plutonium concentration material were not available for batching, an inert, nonhazardous, non-graphite containing additive was mixed with the material to decrease the concentration of fissile material and to make plutonium recovery impractical from the final waste form. Per procedure, any foreign objects (e.g. metal items, screws, nuts, or bolts) found during the repackaging operations in Building 371 were removed prior to repackaging this inorganic nonmetal debris waste. A process flow diagram for the Low-grade Oxide Repackaging process is provided in WSRIC Process 371-35, Figure 35.1.^(6,7,11,12)

Section B-3a(1)(ii) of the WIPP WAP allows for reduced headspace gas sampling for thermally treated waste streams. Specifically, a waste stream may qualify for reduced headspace gas sampling if it complies with the following three criteria:

- The waste stream or waste stream lot must consist of more than 10 containers.

- The waste stream must have either been generated using a high-temperature thermal process or been subjected to a high-temperature thermal process after generation that resulted in the reduction of matrix-related VOCs in the headspace to concentrations below the PRQLs in Permit Attachment B3, Table B3-2.
- The site must have documentation demonstrating that high-temperature thermal processes were used.

The TRM Inorganic Nonmetal Debris (D006, D007) waste stream complies with each of these criteria as follows:

- The waste stream consists of 221 containers of waste.⁽⁹⁾
- The waste stream was generated in furnace operations in which the temperatures were in excess of 450 °C. This temperature would have effectively removed VOCs and semi-VOCs that may have been present in the waste matrix. Confirmatory headspace gas sampling of a random selection of 14 containers from the waste stream demonstrates that the concentrations of matrix-related VOCs in the headspace gas is below their associated PRQLs.⁽¹⁰⁾
- Reference 8 provides the acceptable knowledge documentation of the high-temperature thermal processes used.

7.20.5 RCRA Characterization

This waste stream is characterized as a mixed waste. The specific BWR Baseline Book Subpopulations and WSRIC Process Numbers associated with TRM inorganic nonmetal debris wastes assigned EPA hazardous waste number D007 and D008 are listed in the WEMS AK Waste Stream Summary for Profile Number RF121.01.⁽⁹⁾

Several of the operations that generated oxides (including IDC 060) used acids (e.g., nitric, hydrochloric, and sulfuric) and bases (e.g., sodium and potassium hydroxide) which may be corrosive under RCRA. However, the wastes from these operations are the result of being dried to an oxide form and will not contain residual or free liquid. Since there is no residual or free liquid present, the waste cannot exhibit the characteristic of corrosivity.⁽⁴⁾

Operations in Buildings 559, 707, 777, and 779 that generated oxides (including IDC 060) used F-listed and toxicity characteristic organic solvents (primarily carbon tetrachloride, 1,1,1-trichloroethane, Freon, and methanol) for cleaning and degreasing plutonium metal parts and machine turnings. Plutonium metal from these operations was either re-used in the foundry or oxidized and the oxide sent for plutonium recovery. The oxidation of the plutonium metal would drive off any organics, and therefore, the oxides will not exhibit the characteristic of toxicity for organic compounds. Also, because the solvents came into contact with the plutonium metal that was not a solid waste, the "mixture rule" does not apply to the oxide derived waste materials. Therefore, oxides are not F-listed wastes.⁽⁴⁾

RCRA-regulated organic and metal compounds were not used in any of the other oxide generating or repackaging processes.^(4,6)

Containers in this waste stream consist of low-grade oxide derived debris that were repackaged under WSRIC process 371-35 in Building 371 as IDC 532C. These debris wastes were generated by similar plutonium recovery processes and are considered one waste stream. Historical analytical data is available for a majority of the feed oxide IDCs associated with the production and recovery operations (waste stream RF141.02). Statistical analysis completed on this historical data indicates that the concentrations of chromium and lead in low-grade oxides may exceed regulatory levels. Therefore, EPA Waste Codes D007 and D008 are applied to this waste stream which is the debris derived from the RF141.02 oxide waste stream.⁽⁴⁾

Visual examination of waste contents at the time of packaging, and/or RTR is used to verify that the waste stream does not contain residual or free liquid, explosive, non-radionuclide pyrophoric materials, compressed gasses, or reactive waste. Therefore, this waste stream does not exhibit the characteristics of ignitability (D001), corrosivity (D002), or reactivity (D003).

No discarded chemical products, off-specification species, chemical residues, and spill residues thereof (40 CFR 261.33) were included in this waste stream and no hazardous waste from specific sources (40 CFR 261.32) was generated at the site. Therefore no K, U, or P listings have been applied to this waste stream.^(4,5,6,7)

Beryllium parts were used in the manufacture/assembly of weapons components, and residual beryllium contamination of plutonium parts may have occurred; therefore, the oxides may have been contaminated with beryllium and residual quantities of beryllium may be present in the waste stream. Any beryllium present (less than 1 % by weight) is as a contaminant of the process and not as unused commercial chemical product, and therefore is not a P015-listed waste.^(3,4)

Headspace gas sampling and analysis detected two VOCs (toluene and methanol). Statistics were calculated based on using one-half the method detection limit (MDL) for less-than-detectable observations with data transformation applied where appropriate. Using this "WIPP directed" method, the calculated 90 percent upper confidence limit (UCL₉₀) of the mean concentrations for none of the analytes were found to exceed their associated RTL values. Therefore, the headspace data confirms the acceptable knowledge characterization that no characteristic volatile organic or F-listed solvent EPA codes are applicable.⁽¹⁰⁾

7.20.6 Transportation

The payload containers in the waste stream must also comply with the TRUPACT-II Authorized Methods for Payload Control (TRAMPAC) requirements. Flammable volatile organic compounds (VOCs) were not identified in this waste stream based on the descriptions in the *BWR Baseline Book* and *WSRIC Building Books*, and headspace gas sampling and analysis. Therefore, flammable VOCs in the payload container headspace do not exceed 500 ppm.^(4,5,6,10)

7.20.7 Radionuclides

Table 7.20-3 summarizes the radionuclides may be present in TRM Inorganic Nonmetal Debris stream.⁽³⁾

Table 7.20-3, TRM Inorganic Nonmetal Debris (D007, D008)

IDC	Description	Radionuclides
532C	Downblended Oxides <10%, Downblended Misc. Oxides	WG Pu, Am-241, DU, EU

Key: WG Pu - weapons-grade plutonium

Note: Am243 and Np237 may be present due to ingrowth in waste containing WG Pu.⁽³⁾

7.20.8 References

1. RFETS 2004. Transuranic (TRU) Waste Management Manual, Version 7, 1-MAN-008-WM-001.
2. DOE 1995. Transuranic Waste Baseline Inventory Report, Revision 2. DOE/CAO-95-1121.
3. RMRS 2004. RFETS TRU Waste Acceptable Knowledge Supplemental Information. RF/RMRS-97-018, Revision 11.
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5. Waste and Environmental Management System (WEMS) database.
6. RFETS 2003. Waste Stream and Residue Identification and Characterization Building 371, Version 7.0.
7. RFETS 2003. Residue Repack, Building 371, Revision 5, PRO-544-REPACK-371.
8. WASTREN 2003. Interoffice Memorandum from Vivian S. Sendelweck to Waste Records. Oxide High-Temperature Thermal Process Documentation. VSS-025-2003. August 12, 2003.
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11. DOE 2001. Memorandum from Barbara A. Mazurowski to Robert E. Tiller, Approval of Variance Request RFPK-DOE-474.1-VR-062B, Termination of Safeguards on Attractiveness Level D Waste, AMFPA:NRD:SB:01-00441, March 15, 2001.
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